

REMARKS

Claims 48-50, 54-59, and 74-77 were pending in the present application prior to this Response and are currently at issue.

In the Office Action dated April 17, 2008, Claims 48-50, 54-59, and 74-77 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application No. 2002/0011210 to Satoh et al. ("*Satoh*") in view of U.S. Patent Application No. 2007/0062646 to Ogawa et al. ("*Ogawa*").

35 U.S.C. § 103(a) Rejection of Claims 48-50, 54-59, and 74-77 over *Satoh* in view of *Ogawa*

Claims 48-50, 54-59, and 74-77 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Satoh* in view *Ogawa*. Applicants assert that it would not have been obvious to combine *Satoh* and *Ogawa* to teach every element of independent Claims 48-50, 54-59, and 74-77 of the present application. The Examiner recognizes that *Satoh* fails to teach "an inlet plate configured to disrupt a reactive flow flowing through the second inlet into the process chamber," as recited in independent Claim 48 of the present application. In addition to failing to teach a plate configured to disrupt the flow of reactive species through the second inlet, *Satoh* *explicitly* teaches away from a plate being located along the flow path through the second inlet. In particular, *Satoh* recites:

...use of rectilinear piping with a large internal diameter and a valve that does not restrict flow between the remote plasma discharge chamber and the reaction chamber, deactivation (recombination) of fluorine active species is reduced, due to reduced collisions with the piping surface and structure within the valve... Furthermore, reduced collisions also minimizes thermal energy generated when fluorine active species is deactivated, thus reducing overheating of the piping and the valve.

(emphasis added) (*Satoh*, paragraph 26). This passage in the "Summary of the Invention" of *Satoh* discusses that it is advantageous to reduce the amount of restriction of flow between the remote plasma discharge chamber and the reaction chamber to prevent deactivation or recombination of fluorine active species. Thus, this passage teaches away from an inlet plate

being located between the remote plasma generator and the reaction chamber to restrict, or disrupt, a reactive flow. *Satoh* also recites:

In connection with the structure or function of the piping connecting the reaction chamber and the remove plasma discharge chamber, the following problems are caused:

...if piping from the second plasma discharge chamber to the reaction chamber is too long or bends at an acute angle, due to higher contact probability with the piping surface en route or by colliding with the corner portion of the bent piping, the amount of fluorine active species decreases. Decreased fluorine active species lowers the cleaning rate within the downstream deposition chamber and results in insufficient cleaning.

(emphasis added) (*Satoh*, paragraphs 0039-0041). This passage of *Satoh*, like the previous passage, indicates that fluorine active species contacting piping surfaces (or other structures) en route to the reaction chamber decreases the amount of fluorine active species – due to deactivation or recombination – and is thus a problem. Accordingly, it would not have been obvious to locate an inlet plate to disrupt a reactive flow flowing through the second inlet into the process chamber, as recited in Claim 48 of the present application. *Satoh* teaches that adding such a structure between the plasma generator and the reaction chamber to disrupt the flow path is disadvantageous for a plasma generating system, thereby causing overheating of piping and valves as well as reducing the cleaning rate of the reactive species. Thus, it would not be obvious to one skilled in the art, in view of the teachings of *Satoh*, to add an inlet plate that would disrupt or restrict the reactive flow to a plasma CVD device. Nor do the teachings of *Ogawa* counter this particular teaching away in the primary reference for a process chamber with the flow configuration as claimed.

Further, the present application states that “[c]urrently, in the industry it is generally considered disadvantageous to disturb or disrupt the reactive flow of reactive species because of the commonly held belief that the detrimental recombination of reactive species would occur at too great a frequency. However, the inventors have discovered that a controlled disruption of a reactive flow offers flow control advantages which outweigh the risk of detrimental

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recombination of reactive species...” (paragraph 0059). Hence, the inventors of the present application recognize the disadvantages discussed above in *Satoh* yet have found that such a disruption of the reactive flow can be used advantageously. Thus, because *Satoh* teaches away from disrupting the reactive flow of reactive species between a remote plasma generator and the reaction chamber, it would not have been obvious to one skilled in the art to add any structure between the remote plasma generator and the reaction chamber that would disrupt the flow of reactive species from a remote plasma generator. Accordingly, the Applicants assert that it would not have been obvious at the time of invention of the present application to combine the plate taught by *Ogawa* – or any plate or structure configured to disrupt flow taught by any other prior art reference – with the plasma CVD device taught in *Satoh* to teach each limitation of Claims 48-50, 54-59, and 74-77 of the present application. Therefore, the Applicants respectfully request the rejection of Claims 48-50, 54-59, and 74-77 under 35 U.S.C. § 103(a) as being unpatentable over *Satoh* in view *Ogawa* to be withdrawn.

CONCLUSION

Applicants assert that pending Claims 48-50, 54-59, and 74-77 are in condition for allowance. Applicants respectfully request the Examiner to grant allowance of the present application. The Examiner is invited to contact the undersigned attorney for the Applicants via telephone if such communication would expedite the allowance of this application.

No fees are believed due relating to the filing of this Response. However, the Commissioner is hereby authorized to charge Deposit Account No. 11-1410 for any fees which are due and owing from this filing.

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Respectfully submitted,

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